REMARKS

Summary of Amendments

Claims 1-4 (as well as 5, although currently withdrawn) and 11 have been amended. The changes are almost exclusively of editorial significance, addressing the objections made in the Office action, except for a change that is of technical significance, made to a preposition in the claim 1 recitations.

Election/Restriction

As Applicant's election of species in the reply filed on October 21, 2004 was made without traverse, Applicant acquiesces to the election/restriction requirement having been made final.

The present invention as presented in the specification is divided into three embodiments: (1) the embodiment of Fig. 2; (2) the embodiment of Fig. 3; and (3) the embodiment of Figs. 4 and 5.

Claim 1, broader than Embodiment (1), is generic to Embodiments (1) and (2). Embodiment (2) is claimed specifically in dependent claim 5, which currently has been withdrawn, but since claim 5 depends indirectly from claim 1, should claim 1 be held allowable, it is respectfully submitted that claim 5 should be rejoined and held allowable as well, on the grounds that claim 5 depends from an allowable base claim.

Claim Objections

Claims 1-4 and 6-13 were objected to for lack of antecedent basis for the terms "the gauging subject" and "said measure article" in claims 1 and 2, respectively.

Claims 1 and 2, and in turn claims 3-5 and 11, have been amended to recite a/the "gauging subject article" for consistency in every instance in which the item whose internal temperature is being gauged by the claimed gauge is mentioned.

Rejections under 35 U.S.C. § 102
Claims 1-3, 6, 7 and 9-11; Ward '091

Claims 1-3, 6, 7 and 9-11 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 4,904,091 to Ward.

The Ward patent is directed to a thermocouple device for materials testing in wind tunnels. In making the rejection of claim 1 under this section, the Office action initially states,

> Ward discloses a temperature gauge comprising:
> (. . .)
> a contact (26) exposed in the tip end of the thermocouple and contacting a temperature measuring site of a subject (30).

This assertion suggests that the Ward gauge is brought against (contacted on) a measuring site on a test material to measure its temperature. But as is clear from Fig. 2, from column 2, lines 42-47 and 60-64, and from column 3, lines 4-6 in the Ward reference, Ward's thermocouple actually forms an *integral part of the test material*; moreover in Ward, the gauge actually forms part of the surface of the test material—the "contact" (thermocouple wire) forms a part of the surface. Thus the "contact" cannot said to be contacted on and pressed against the temperature measuring site in the test material in Ward.

In particular, Ward states, in column 2, lines 43-47—part of the section that is referred to at the top of page 4 of the Office action—

> Each lead is then either tack welded or peened into their respective opposite groove 25. *Ceramic filler 26 then fills opposite grooves 25, thoroughly covering the leads of thermocouple wire 20 and bonding them flush with the tip end 14.* Next, epoxy resin 27 is potted around thermocouple wire 20 when it enters ceramic insulator rod 15 at the head end 13.

(Emphasis added.)

Moreover, Ward goes on to stipulate, in lines 60-64 of column 2, that

> The threaded average temperature thermocouple 11 is then inserted, i.e., screwed into threaded cylindrical receptacle 32 *until tip end 14 is flush with the outer surface of test material 30.*

(Emphasis added.)

In the first sentence of the Background, Ward notes,

> In materials testing, it is often useful to measure various temperature properties of a test material. For example, in wind tunnel testing, researchers often measure the effects of various pressure and force conditions in relation to the temperature of the test material.

> Specifically, determining the average surface temperature of a particular portion of the test material is often very helpful.

Consequently, as mentioned above, in the Ward device, the thermocouple is an integral part of the test material; the thermocouple penetrates the entire thickness of the test material and forms a part of the test-material surface so as to gauge its average surface temperature.

In contrast, a temperature gauge according to the present invention is "for gauging the temperature of a temperature-gauging site in a gauging subject article," and comprises:

> a thermocouple having a tip end;
> a temperature-gauging contact exposed in the tip end of said thermocouple and contacting, exposed as it is, the temperature-gauging site in the gauging subject article; and
> detachable retaining means for mechanically pressing upon said temperature-gauging contact to retain it against the temperature-gauging site.

Furthermore, Ward, column 2, lines 53-55 (cited in Office action in rejecting claim 11) states, "[B]oth threaded bolt 12 and test material 30 should share similar thermal properties such as conductivity." This readily follows from Ward's teaching, as has been emphasized herein, that the thermocouple is an integral part of the test material. On the other hand, while it is true that claim 11 limits the *thermal expansion coefficient*—which, granted, is a "thermal property"—of the retaining member and gauging subject article to being about the same, the present invention actually sets forth the opposite with regard to the thermal conductivities of the retaining member and gauging subject article.

A stated object of the present invention, (paragraph [0013] of the present specification) is

> to render a temperature gauge in which simple replacement of the thermocouple even if damaged is possible, and moreover *in which heat from the temperature-gauging site is readily transmitted to the temperature-gauging contact,* shortening time until the measurement temperature stabilizes.

(Emphasis added.)

Accordingly, as described in paragraphs [0048] and [0051], the thermal conductivity of ceramic susceptor, being the gauging subject article exemplified in the embodiments is 170 W/mK. Meanwhile, the thermal conductivity of the tubular

member serving in the embodiments as the "detachable retaining means for mechanically pressing upon said temperature-gauging contact to retain it against the temperature-gauging site" recited in claim1, is 1 W/mK (paragraph [0050]).

Thus, while in the present invention, "heat from the temperature-gauging site is readily transmitted to the temperature-gauging contact," thanks to the difference in thermal conductivity between the gauging subject article and the thermocouple retaining means, the fact that Ward stipulates that "the threaded bolt 12 and test material 30 should share similar thermal properties such as conductivity" is further evidence in support of the assertion that the Ward device forms an integral part of the test material.

Rejections under 35 U.S.C. § 103

- Claims 12 and 13; Ward '091 in view of Shiyoku (JP) '291; Shiyoku (JP) '291 in view of Ward '091
- Claim 4; Ward '091 in view of Huebscher '305

In sections 7 and 8 of the Office action, claims 12 and 13 are rejected under 35 U.S.C. § 103(a), both over Ward in view of Shiyoku (Japanese Unexamined Pat. App. Pub. No. 2002-164291, cited in Background of present specification), and Shiyoku in view of Ward. In particular, it is alleged under these sections of the Office action that it would be obvious to apply the Ward thermocouple device to a ceramic susceptor as disclosed in Shiyoku, as it would be to replace the Shiyoku thermocouple in the Shiyoku susceptor with the Ward thermocouple device.

Nevertheless, it is respectfully submitted that if the device as disclosed in the Ward reference were employed to gauge the temperature of a susceptor for semiconductor manufacturing equipment, the thermocouple would be of thermal conductivity on par with, and its tip would be flush with, the wafer-holding/heating surface of the susceptor. Consequently, this Ward-Shiyoku combination would give rise to doubts as to the suitability of such a configuration for maintaining the temperature uniformity—critical to semiconductor device manufacturing—of the working surface of the susceptor, and to doubts as to whether stable measurement temperature could be achieved in a short enough time to make the Ward-Shiyoku configuration suitable for semiconductor device manufacturing

Furthermore, for the reasons set forth above in arguing against the § 102 rejections, it is respectfully submitted that claim 1 should be held allowable, and that in turn so should claims 12 and 13 be, inasmuch as these claims depend from an allowable base claim, rendering moot the rejections under these sections.

In section 9 of the Office action, claim 4 is rejected under 35 U.S.C. § 103(a) over Ward in view of U.S. Patent No. 3,751,305 to Huebscher. Claim 4 depends ultimately

from claim 1, and as just asserted, inasmuch as claim 1 should be held allowable—inasmuch as the patentability of the present case does not rest with a claim 1 limited by claim 4 and the intervening dependent claims—it is respectfully submitted that claim 4 should in turn be held allowable.

IDS

In Applicant's IDS file March 28, 2005 in the present application, Cite No. F1 is the primary reference used in rejecting the Japanese patent application on the basis of which priority is claimed in the present application. In Cite No. F1, Japanese Unexamined Pat. App. Pub. No. H05-206030, a complex assembly involving a mounting plate 6, sealing flange 14, and tubular cap 15 is employed to mount into the top wall of a reaction chamber 20 (Fig. 2 in the reference) a temperature gauge 8 inside a tubular piece 5 extending to a susceptor 1. The tubular piece 5 has a threaded (5b) tip portion 5a that screws into a terminal 4 in the form of a round plug having a threaded (4a) recess 4b and fitted into the susceptor 1. It is to be noted that the tip of the temperature gauge 8 is not exposed, but is sealed inside the tip portion 5a of the tubular piece 5; moreover this tip portion 5a does not contact the susceptor 1 directly, but is screwed into the recess 4b of this special terminal 4, stipulated in paragraph [0016] of the reference as being made of a heat-resistant metal.

Consequently, these configurational features of the device disclosed in H05-206030 are contradistinctive to a temperature gauge as recited in claim 1 of the present application, in particular because the temperature gauge as recited in claim 1 comprises "a temperature-gauging contact exposed in the tip end of said thermocouple and contacting, exposed as it is, the temperature-gauging site in the gauging subject article."

Allowable Subject Matter

Applicant gratefully acknowledges that claim 8 has been indicated as being directed to allowable subject matter. Nevertheless, based on the present amendments and accompanying arguments it is believed that not only claim 8, but all the pending claims should be held allowable.

Accordingly, Applicant courteously urges that this application is in condition for allowance. Reconsideration and withdrawal of the rejections is requested. Favorable action by the Examiner at an early date is solicited.

Respectfully submitted,

March 29, 2005

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